

Good sound environment

in educational premises



Ecophon[®]
SAINT-GOBAIN

A SOUND EFFECT ON PEOPLE

The natural sound environment

supports teaching and learning

For thousands of years human beings' sense of hearing evolved in an outdoor, natural sound environment. An environment where the sound level is perceived as pleasant and where sound is absorbed, or scattered, having a positive effect on our hearing. But we now spend almost 90 % of our time indoors, where we are often exposed to rooms with hard materials and surfaces that create high sound levels and sound reflections. This unnatural sound environment affects us mentally and physically and has a great impact on our well-being, ability to hear, communicate and learn. In order to improve the indoor sound environment in educational premises, we should strive to re-create the natural outdoor sound environment.





CONTENT

4	Education sound comfort for teaching and learning	22	Sport halls
6	The Ecophon approach for creating room acoustic comfort	24	Changing and shower rooms
8	Supporting different teaching methods	26	Music rooms
9	How to create a good sound environment	28	Kindergarten
10	Different room types have different acoustic needs	30	Design possibilities for the eye and ear
12	Traditional classroom	34	Indoor environment important aspects in schools
14	Classroom for group work	35	Practical and robust acoustic systems
16	Open learning spaces	36	Product performance that matches sound requirements
18	Corridors and break-out spaces	37	System solutions overview
20	Dining room and cafeteria	39	Our expertise at your disposal

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Education

sound comfort for teaching and learning

Good learning environments are characterised by good speaker comfort for teachers and listening comfort for students. Therefore it is important to control sound levels, unwanted noise and reflections, which allows for greater concentration and clear and comfortable speech. As our ears are developed for hearing outdoors, we need to get closer to a perceived “natural outdoor” learning environment, the ideal setting from a sound comfort perspective.

The positive effects of a good sound environment in educational premises include:

- Reduced vocal strain and voice disorders for teachers
- Improved concentration
- Reduced tiredness, fatigue and stress levels
- Easier to hear and be heard with improved speech clarity
- Optimised environment for multi-communicational activities like (e.g.) groupwork
- Improved student behaviour and reduced burden on school and classroom management

Educational premises mean more than classrooms

Designing the sound environment in an educational building requires an understanding of the specific teaching methods used and communication activities that take place, in order to specify the type, amount and placement of absorption; also, which acoustic qualities that should be controlled. When we shift from the traditional cellular classroom towards open learning spaces, there are additional challenges which must be considered. These include sound propagation, the speech and listening comfort, etc. In most cases, just meeting minimum classroom acoustic standards, often quantified in reverberation time, is not enough. To achieve the wishes of teachers and students, other parameters like speech clarity, sound level and sound propagation must also be considered. Going beyond minimum acoustic standards to fulfil teachers' and students' needs, will create a sound environment which improves the whole teaching and learning process.



Photographer: Hans Georg Esch



Photographer: Hans Georg Esch

The Ecophon approach

for creating room acoustic comfort

Meeting the standards

Standards, building regulations and guidance documents regulate or give advice on values for acoustic performance. The values are often a common minimum platform for various interests, rather than specialised for the complexity of human sound perception, specific activities inside the room and the room itself.

At Ecophon, we believe the optimal solution goes beyond many of today's regulatory or guidance documents.

Going beyond the standards

When aiming to define people's acoustic needs, describe or assess the acoustic environment, it is advisable to use acoustic parameters that reflect the relevant acoustic demands and preferences. Acoustic standards around the world mainly include reverberation time requirements. However people often have other acoustic preferences that go beyond reverberation. Moreover, our sense of hearing is multidimensional, so it cannot be defined by one single parameter. When the room acoustics are tailored to the activities, room layout and people inside, you can achieve room acoustic comfort that is in tune with human beings and the way we hear.

The people

Consider how many, what age and any hearing impairments or sensitivities.

The activity

Find out the teaching or learning methods and what are the communication tasks.

The room

Think about the: size; shape; volume; surfaces and furnishing.



1. Find out how the people perceive and are affected by sound

Start by asking people how they perceive the acoustic environment and what their acoustic preferences are.

2. Take activities into account

Different activities require different acoustic priorities. Find out what the room is to be used for and the most highly prioritised acoustic parameters, such as sound strength, sound propagation, speech clarity or reverberation.

3. Use relevant acoustic qualities and measures

Acoustic perception is multi-dimensional, so several acoustic qualities are needed to objectively define acoustic requirements and ascertain that they are fulfilled.



If the main acoustic priority is lowering the sound strength, G (dB) is a relevant acoustic measure.



If the main acoustic priority is reducing sound propagation, DL_2 (dB) and DL_f (dB) are relevant acoustic measures.



If the main acoustic priority is optimal speech clarity, D_{50} (%) is a relevant acoustic measure.



If the main acoustic priority is optimal reverberation, reverberation time T (sec) is a relevant acoustic measure.

If the main priority is listening comfort then measuring frequency band 125 Hz is a relevant acoustic measure.

4. Design the room and choose materials that enhance acoustic comfort

When designing the room, it is important to consider how the room's shape, volume and choice of materials will affect the acoustics.

The four acoustic qualities

Sound strength

G (dB) measures the extent to which a room amplifies the sound from a sound source, compared to measurement in a laboratory with no sound reflections.

Sound propagation

DL_i (dB) measures how the room contributes to sound propagation compared to an outdoor environment with no sound reflections, at a specified distance from the sound source. DL_2 (dB) measures the extent to which the sound strength drops when the distance from the sound source is doubled.

Speech clarity

D_{50} (%) is the energy of all useful reflections including the direct sound, which enhance speech clarity, divided by the total energy. The higher the value, the better the speech clarity.

Reverberation

Reverberation time, T (sec) indicates how long it takes for the sound to drop by 60 dB after a sound source stops emitting sound.

Listening comfort: How low-frequency sound at 125Hz affects listening comfort in the classroom.

Supporting different teaching methods

We are seeing an on-going shift away from lecture style teaching towards an environment where the teacher is seen as a facilitator, providing for individual differences, achievement and learning styles. This environment is expected to motivate students to become more engaged and actively involved in their education. This also affects the sound environment and creates new needs, including how the room should be designed acoustically to support activities and teaching methods. The main types of teaching styles and room types are:



Traditional classroom teaching

- Speech clarity is prioritised
- Speech comfort for teachers
- Listening comfort for students



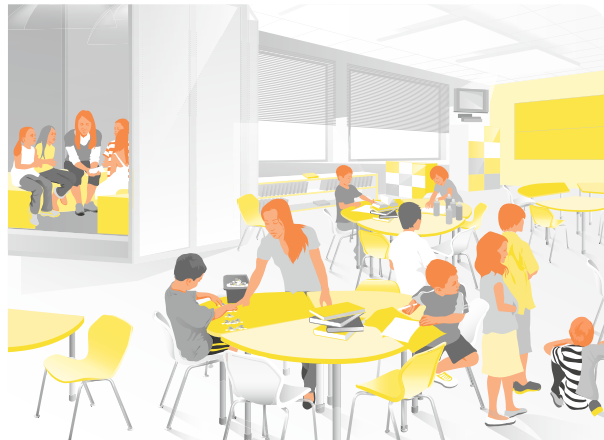
Group work

- Low sound level is prioritised
- Speaking and listening comfort



Open learning spaces

- Lower sound level and short sound propagation are prioritised



How to create a good sound environment

Improving the sound comfort for speakers and listeners will have a significant effect on the learning efficiency, and wellbeing, of teachers and students. Here are some tips on how to improve the sound environment, with accompanying benefits:



Acoustic support for traditional teaching

- The main task in traditional teaching is to increase speech clarity, listening comfort and speaker comfort.
- Reduce sound levels by installing Class A absorbers in the ceiling.
- Reduce low frequency sound by adding low frequency sound absorbers on top of the acoustic ceiling, covering approx. 45% of the total ceiling area, to increase the listening comfort.
- Reduce detrimental late sound reflections by installing wall absorbers and diffusors to support speech clarity.
- Add a speech reflector in the ceiling, above the position where the teacher normally addresses the students, for speaker feedback and comfort.



Acoustic support for group work

- The main task for group work is to reduce the sound level by installing a Class A acoustic ceiling.
- Reduce low frequency sound by adding low frequency sound absorbers on top of the acoustic ceiling, covering approx. 45% of the total ceiling area, to increase the listening comfort.
- To further reduce the sound level and increase sound comfort, wall absorbers should be installed, especially where the ceiling height exceeds 2.9m.



Acoustic support for open learning spaces.

- Reduce sound level and sound propagation by installing a Class A ceiling with AC* value ≥ 180 .
- Reduce propagation and horizontal sound reflections by installing wall absorbers.



*AC-value (Articulation Class) is a method of classifying acoustic ceilings by how much the ceiling helps to shorten sound propagation. The higher the AC-value, the shorter the sound propagation.



Photographer: Hans Georg Esch



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Photographer: Hans Georg Esch



Photographer: Hans Georg Esch



Photographer: Ole Jais



Photographer: Søren Weile



Photographer: David Troen

Different room types

have different acoustic needs

Acoustic demands and sound requirements are prioritised differently depending on the activity and type of room. For more information about Ecophon's systems and products please refer to our homepage www.ecophon.com.

On the following pages we will give you some examples of common types of rooms in schools:

Classroom for traditional teaching

Solutions for one person speaking from the front.

Classroom for group work

Solutions to reduce sound levels of many simultaneous speakers.

Open learning spaces

Reducing sound levels and sound propagation.

Corridors and break out spaces

Reducing sound levels and sound propagation.

Dining room and canteen

Solutions for high sound intensity areas with hygienic requirements.

Sports halls

Durable and strong solutions for high noise activity and tough hits.

Changing and shower rooms

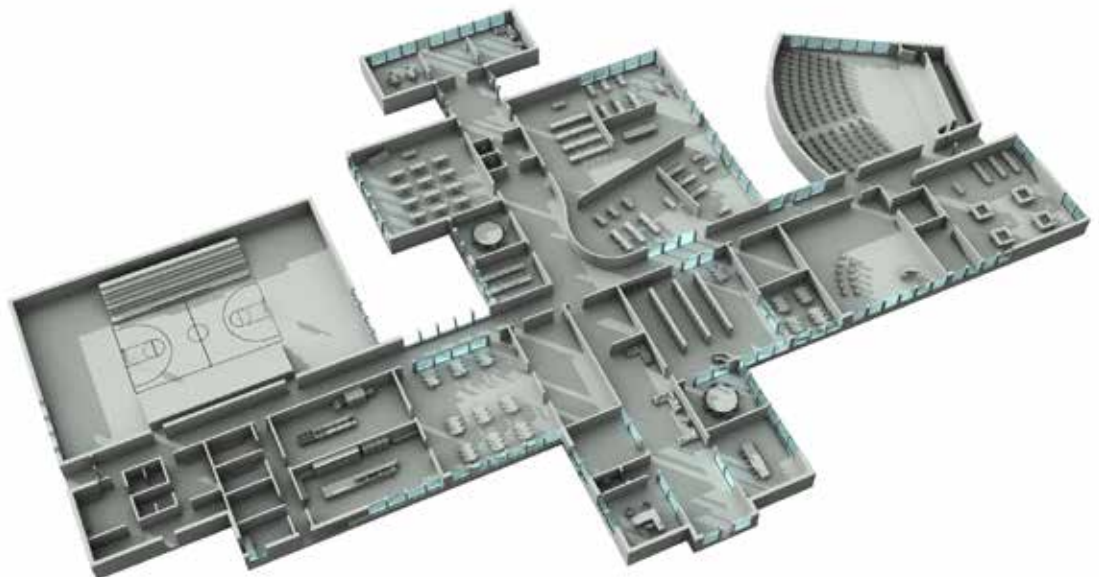
Impact resistant and hygienic systems.

Music rooms

Custom made recommendations by our Concept Developers.

Nurseries

Reducing sound levels and sound propagation.





Traditional classroom

Traditional classrooms, and teaching methods, usually infer a teacher speaking at the front of the class, whilst students are quiet and attentive. In this situation the main priorities are to ensure speaker comfort for the teacher and ensure that the speech is clear, and carries to all students in the room. Therefore, designing the sound environment for traditional classroom teaching means knowledge about how to mix and position sound absorbers, diffusors and speaker reflectors, with properties that create the desired sound environment.

Solution

The main task for traditional teaching is to create good speech clarity, listening and speaker comfort. This is achieved by combining different modules of the **Ecophon Master™ Rigid** system together with **Ecophon Akusto™ Wall** absorbers.

Ecophon Master™ Rigid, an impact resistant absorber, will reduce the general sound level and improve the sound comfort of the classroom.

Ecophon Extra Bass, which is a low frequency absorber encapsulated in a perforated film, is placed in a U-shape on top of the Master™ Rigid ceiling. Master™ Extra Bass absorbs sound at 125 Hz which improves the listening comfort and adds to speech clarity in the classroom.

Ecophon Master™ Rigid is available with a special **gamma** surface, a speech reflector which is integrated in the ceiling where the teacher is normally standing. The gamma surface will give the speaker feedback thus avoiding voice overstrain.

The Ecophon Master™ Rigid system should be complemented by Ecophon Akusto™ Wall absorbers on the back wall to reduce late horizontal sound reflections. This will improve the speech clarity of the room.

For more information on Ecophon Master™ Rigid please see our website.





Photographer: Hans Georg Esch





Classroom for group work

Alternatively the classroom can be used for group work, which means a lot more interactive communication between people. In this case it is important to combine speech clarity and low sound levels within the group, minimising “the lombard” effect and disturbance between the groups.

Solution

The main task for group work is to reduce the sound level.

Ecophon Master™ Rigid, an impact resistant absorber, will reduce the general sound level and improve the sound comfort of the classroom.

Ecophon Extra Bass, which is a low frequency absorber encapsulated in a perforated film, is placed in a U-shape on top of the Master™ Rigid ceiling. Ecophon Extra Bass absorbs sound at 125 Hz which improves the listening comfort and adds to speech clarity in the classroom.

The Master™ Rigid system should be complemented by **Ecophon Akusto™ Wall** absorbers on the back and side walls to reduce horizontal sound reflections. This will improve the speech clarity of the room.

For more information on Ecophon Master™ Rigid please see our website.





Photographer: Hans Georg Esch



Photographer: Ole Jais





Open learning spaces

When moving from cellular classrooms towards open learning spaces, there are additional challenges which must be considered in addition to speech and listening. Open learning spaces are built to facilitate communication, but when many people speak simultaneously, students' tend to raise their voices (the Lombard effect). Therefore, an important task in open learning spaces is to reduce the sound level and decrease sound propagation. Of course, the discipline and teachers control of the activity still has a great impact on the sound environment.

Solution

The main task is to reduce the general sound level and to reduce sound propagation between working groups and classes. This is achieved by training teachers and students to exercise appropriate acoustic behaviour, as we would in a library for instance, to support sound comfort and communication. We recommend contacting our Concept Developer who will assist in developing a suitable acoustic solution.

Install **Ecophon Master™** with AC value ≥ 180 , in the ceiling, and **Ecophon Akusto™ Wall** absorbers on suitable walls to reduce horizontal sound propagation.





Corridors and breakout spaces

A corridor is not just a path of transport. The corridor is also used as a waiting area and a place to study. The high sound level in a corridor doesn't just disturb those in the corridor, but also in adjacent rooms. A high level of noise in corridors often leads to the students bringing it into the classrooms. The requirement is thus to reduce the sound and propagation in corridors, which is accomplished with sound-absorbing acoustic ceilings and wall absorbers.

Recommended acoustic solution

Ecophon Master™ Rigid is an impact resistant acoustic ceiling. The ceiling is fixed by a locking system which holds the absorbers in place if the ceiling is knocked or hit. It may be necessary to include **Ecophon Akusto™ Wall** absorbers to reduce sound propagation.

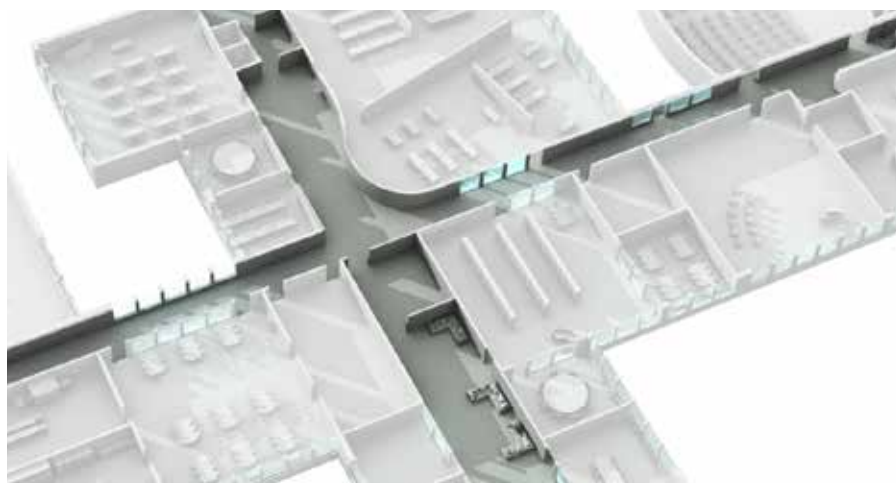




Photographer: Szymon Polański



Photographer: Ole Jais





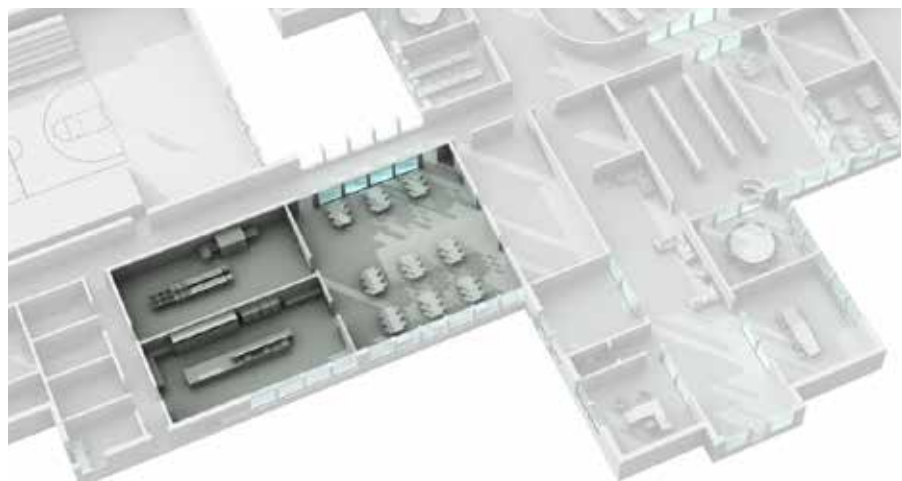
Dining room and canteen

Dining rooms and cafeterias are susceptible to high levels of sound due to large amounts of footfall, speech and clatter from cutlery and plates. For hygienic reasons, these environments are often built of hard, reflective materials, which add to the high level of noise and extensive sound propagation. To reduce the level of noise in dining rooms, we recommend highly absorbing acoustic ceilings as well as hygienic absorbent systems in kitchen areas which are dirt-repellent and easy to clean. The sound propagation can be shortened further by supplying the acoustic ceiling with additional free-hanging absorbers.

Recommended acoustic solution

We recommend **Ecophon Master™** for the ceiling. Where it is necessary to add wall absorption, **Ecophon Akusto™ Wall** which is available in different surfaces, colours, patterns and profiles. To reduce sound propagation further, you can add free-hanging absorbers to the acoustic ceiling, e.g. **Ecophon Solo™**. In areas with hygienic requirements, **Ecophon Hygiene™** can be used.





Sport halls

Sports halls commonly combine large volumes and hard surfaces; add noisy, competitive sport and they can generate high sound pressure levels, long reverberation times and flutter echoes. However, this can be cured by installing highly absorbing, impact resistant wall panels and ceilings.

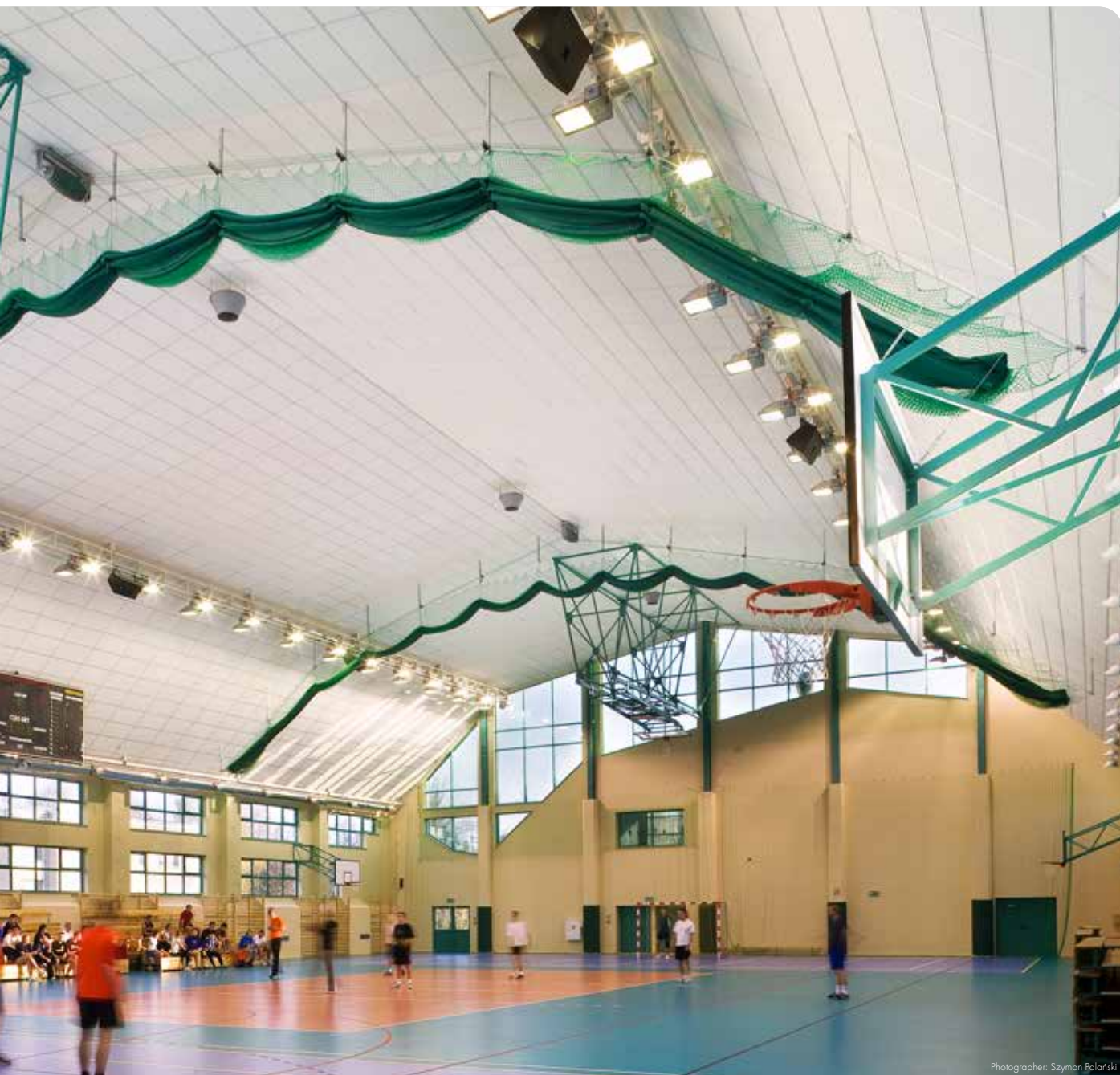
Solution

Ecophon Super G™ for the ceiling and **Ecophon Akusto™ Wall/Super G** for the walls with an impact-resistant surface.

Ecophon Super G™ has two different systems depending on the degree of impact-resistance required.



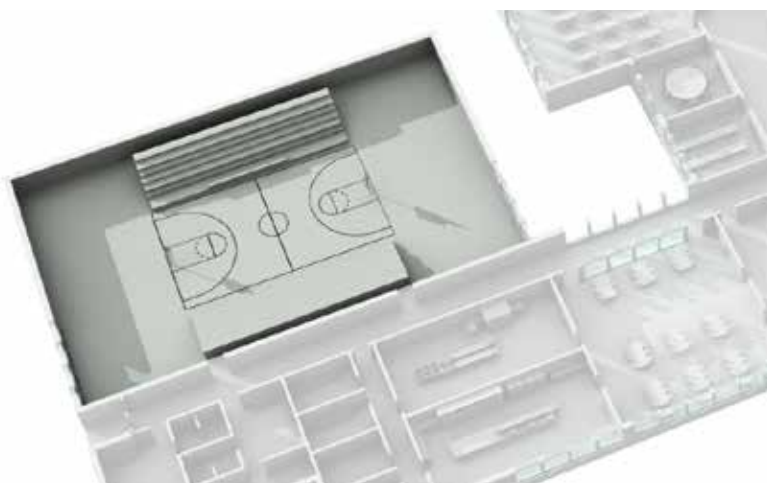
Photographer: Hans Georg Esch



Photographer: Szymon Boleński



Photographer: Sören Weile



Changing and shower rooms

The noise level in changing and shower rooms can be high, due to lively conversation and the use of hard, hygienic materials which reflect and increase the sound level. The acoustics in changing rooms can be improved with sound absorbing and impact-resistant acoustic ceilings. Acoustic ceilings in shower areas must be hygienic, withstand high relative humidity as well as being easy to clean.

Recommended acoustic solution

For changing rooms we recommend impact resistant systems such as **Ecophon Super G™** and **Ecophon Hygiene Advance™ C3** or **Ecophon Hygiene Performance™ C3** in shower areas.





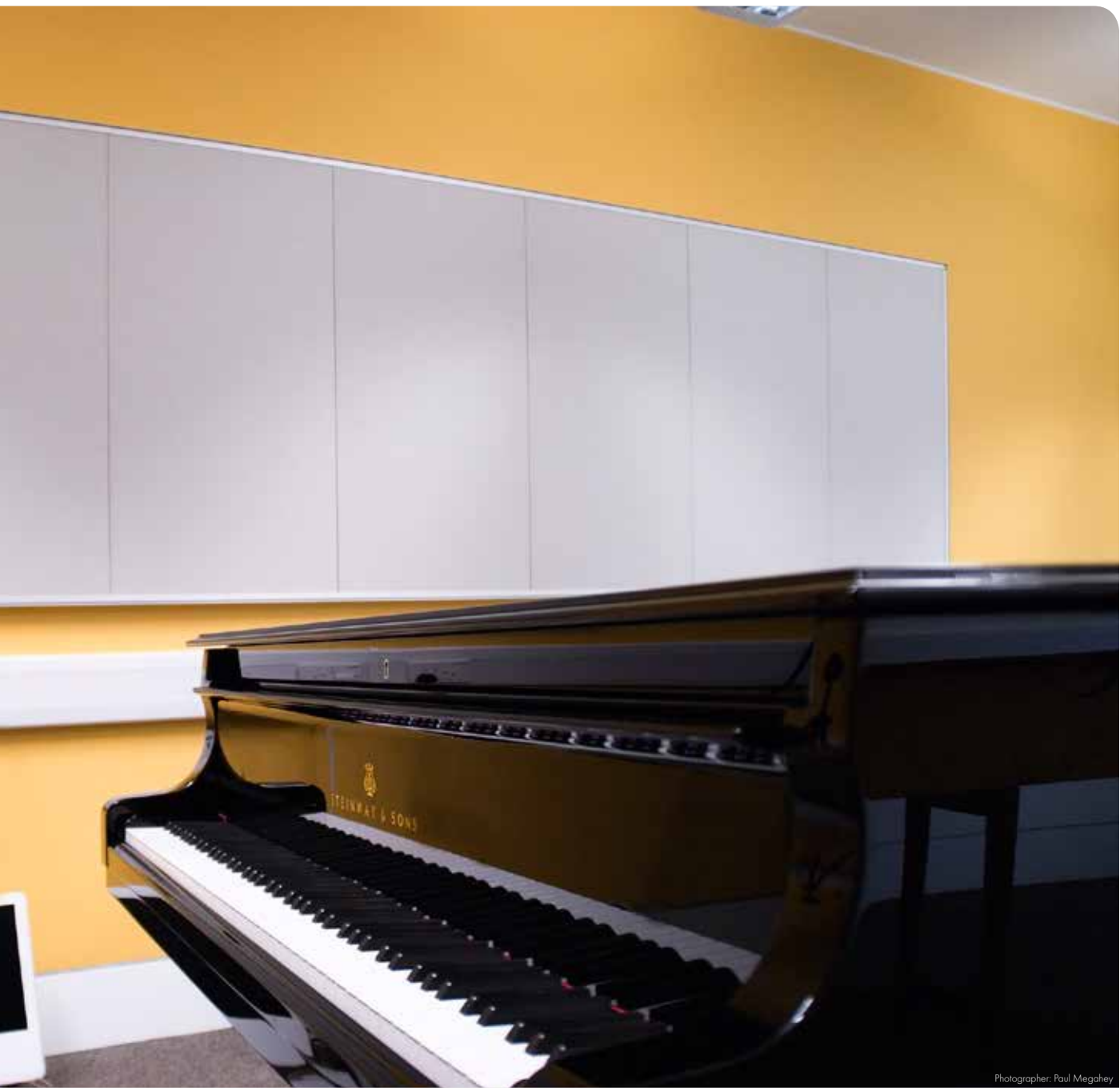
Music rooms

In music rooms the solution depends on the type of acoustic response you want to create. We recommend contacting our Concept Developer who will help develop a suitable acoustic solution. Typical products for this type of environment are Ecophon Master™ and Ecophon Akusto™ Wall absorbers.

Recommended acoustic solution

The solution depends on which type of acoustics you want in the room. We recommend contacting an acoustician or our Concept Developer who will help develop a suitable acoustic solution. Typical products for this type of environment are **Ecophon Master™ Rigid** and **Ecophon Akusto™ Wall**.





Photographer: Paul Megahey



Photographer: Hans Georg Esch



Nurseries and playgroups

Day-care nurseries and after-school centres are lively environments where children move around freely throughout the entire premises. The children's activities vary from quiet reading to playing boisterously and noisily. Large open areas are an invitation to speak over longer distances; an increased level of noise results in the children automatically raising their voices even more, the so-called Lombard effect. The most common request is to reduce the noise level, which can be achieved with highly absorbing acoustic ceilings and wall absorbers. The wall absorbers should be placed lower on the wall compared with school classrooms, in order to adapt the noise absorption to the height of the children and the zone the children generate the noise in.

Recommended acoustic solution

The solution depends on which acoustic solution is wanted in the space. Normally the main acoustic demand is lower sound levels. We recommend contacting our Concept Developer who will help you with a suitable acoustic solution. Typical products for this type of environment are **Ecophon Master™** and **Ecophon Akusto™ Wall**.



Photographer: Hans Georg Esch



Photographier: Sören Weile



Design and function

possibilities for the eye, the ear and the mind

With Ecophon's wide assortment of different acoustic systems, you can combine good acoustics with exciting design solutions. Our ceiling absorbers are available in different models with different edge designs, surfaces and colours.

Options for further consideration of the design and aesthetics include: lighting combinations, colour and light reflections, free-hanging acoustic rafts and acoustic wall panels with a variety of patterns and colours.

Thermally Activated Building Systems – TABS

A fully covering (100%) sound absorbing suspended ceiling is a basic and fundamental starting point, in order to reduce the sound level and support good speech clarity and overall communication quality.

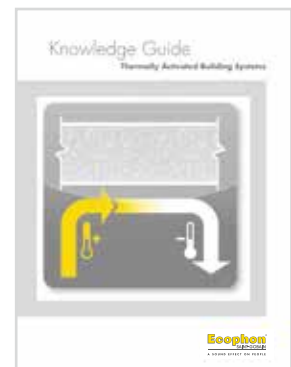
In addition there should be wall panel absorbers to take out late reflections starting with the back wall. Additional low frequency absorption can balance the sound environment in the unwanted and disturbing low frequencies (125Hz) and may be necessary for inclusion of children who are sensitive or vulnerable listeners.

Where it is not possible to have a full suspended ceiling due to TABS (Thermally Activated Building Systems) in classrooms or in large atria, then the combined use of free hanging units and wall panels can greatly help the acoustic environment.

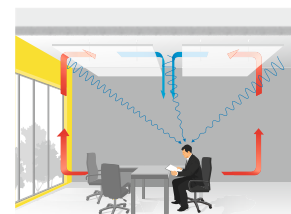
This is where the thermal capacity of the structural mass is utilised to control the temperature in the building in a more efficient and embedded way than traditional heating and cooling systems.

However, be aware that as there may be little or no enclosed void (ODS), then there may be little low frequency absorption (125Hz) which can give an imbalance for speech clarity when low frequency sound can build up and interfere with the speech frequencies.

In order to balance the acoustics in a TABS classroom we would recommend installing free hanging Ecophon Solo™ units at a height of 200-500 mm from the soffit covering about 50 % of the floor plan (around 50 % coverage to maintain the room temperature). In addition Ecophon Akusto™ Wall absorbers should be installed with a 50 mm cavity to incorporate Ecophon Extra Bass behind (our recommendation is to have a minimum of 20 % of the floor area). Installing Ecophon Extra Bass increases the low frequency absorption and improve the room acoustic balance for speech and hearing activities.



For more information on TABS please ask for our Knowledge guide or download it from the website.





TOP: **Ecophon Solo™ Freedom** allowing acoustic absorption without compromising the acoustic performance.

BOTTOM: **Ecophon Akusto™ Wall** Another new possibility is to design sound diffusers by using wall absorbers in combination with book shelf systems.

Note: The bookshelf system is not provided by Ecophon.





Photographer: Bahl Fotografi



Shen Daria Millington

ABOVE: **Ecophon Akusto™ Wall** has the option to combine functional acoustics with unique designs printed on wall panels.

LEFT: **Ecophon Focus™** and **Ecophon Solo™** offers aesthetically pleasing monolithic, free hanging units, which bring the absorption closer to the sound source.

Indoor environment

important aspects in schools

Dust and emission-free

The indoor environment greatly affects both health and comfort in schools. When it comes to minimising risks for dust and emissions, Ecophon's acoustic ceilings are very reliable. Our acoustic systems have been tested and assessed by a number of large institutes.

Ecophon's acoustic products withstand the most stringent requirements, according to Danish Society of Indoor Climate and Finnish M1 and are recommended by the Swedish Asthma and Allergy Association.



Good hygiene

In certain areas, e.g. shower rooms, school kitchens and dining rooms, it is important to maintain good hygiene. Ecophon has the market's widest range of systems for acoustic ceilings with hygienic surfaces that are dirt-repellent as well as easy to clean.

Good light efficiency

Lighting is an important part of the school environment. Ecophon's acoustic ceilings have a high, even light reflection which provides a comfortable diffusion of the light as well as cost-effective lighting. Ecophon's acoustic ceiling with Akutex™ surfaces have a light reflection of approx. 85 % and a light diffusion of approx. 99 %.



Environmental awareness

Our absorbers consist of glass-wool of which approximately 70 % is made from recycled household glassware. The suspension system is made of steel consisting of 50 % recycled materials. The suspension system is completely recyclable. Ecophon also works towards minimising environmental stress by using eco-friendly packaging and effective transportation. Most of Ecophon's products are Swan-marked, which means that our system fulfils those requirements and criteria representing good environmental choices.

Ecophon has developed a new environmental friendly glass wool based on 3RD Technology, which means:

- Natural plant based binder in the glass wool
- More than 70 % recycled glass in the raw material

Practical and robust

acoustic systems

Accessibility

An important function for acoustic ceilings is the easy access to installations above, e.g. ventilation, electric and computer cables. Many acoustic ceilings in schools, not least in corridors, will have to be disassembled during the life cycle of the ceiling. It is therefore important that both suspension systems and absorbers are designed to facilitate disassembly and reassembly, while remaining impact-resistance.



Life cycle and impact-resistance

The technical life cycle of our ceiling systems is often up to twenty years. In schools, we know that the wear is usually much harder than in an office for example. In those areas where there is a risk of blows and hits, we recommend **Ecophon Master™ Rigid** and **Super G™**, systems with impact-resistant surfaces.

Classification of impact-resistance according to SS-EN 13964:

Class 1A ceiling systems are used in sport halls for tough ball sports e.g. handball and tennis.

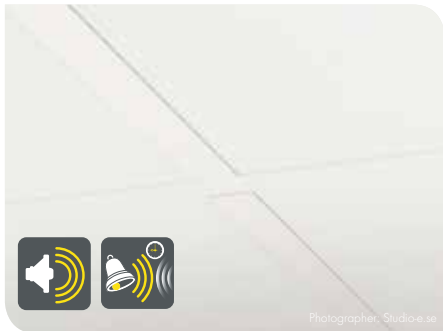
Example: **Ecophon Super G™ Plus A**.

Class 2A ceiling systems are used in sport halls for less tough ball sports, e.g. indoor bandy. Example: **Ecophon Super G™ A**.

Class 2A and 3A ceiling systems are used in corridors and nurseries in areas where impact-resistant ceilings are required. Example: **Ecophon Super G™ A Class 2A**, **Ecophon Super G™ B Class 3A** or **Ecophon Master™ Rigid Dp Class 3A**.

System solutions overview

Ecophon Master™ Rigid system



Ecophon Master™ Rigid – lower the sound level

These panels are 20 mm thick and suitable for classrooms where strict demands are made on good acoustics, durability and where demountability is vital. The system consists of Ecophon Master™ Rigid tiles, Ecophon Connect grid systems and Ecophon Extra Bass. Master™ Rigid impact resistant tiles have a reinforced Akutex FT surface ten times stronger than the standard surface. The system is available with edges; A, E and Dp. The tiles are fixed in the Ecophon Connect to resist impact from below.



Ecophon Extra Bass

For traditional and group-work classrooms. To meet the demands on absorption in the low frequency range (125 Hz), Ecophon Extra Bass 50 mm is installed on top of the Master™ Rigid ceiling in classrooms. The Ecophon Extra Bass absorber is encapsulated in a PE film which makes installation easier.



Ecophon Master™ Rigid with speech reflecting surface gamma – improves speaker comfort

This is our preferred solution for traditional classrooms. A reflector integrated in the ceiling above the speaker providing speaker comfort for the teacher during traditional teaching. A zone of Ecophon Master™ Rigid/gamma could also be extended to support the propagation of the teacher's voice, in classrooms longer than 9 meters. Ecophon Master™ Rigid with speech reflecting surface gamma is available with edges A, E and Dp.



Ecophon Master™ – Shorten the sound propagation and lower the sound level

For open learning spaces and nurseries. A 40mm thick absorber with a AC value ≥ 180 to reduce sound level and minimising sound propagation. The system consists of Ecophon Master tiles and Ecophon Connect grid systems. The system is available in the edges A, B, Ds, E, F and SQ.



Ecophon Super G™ – when impact resistance is important

For ceilings in sport halls, corridors and other environments where there is high risk of mechanical impact. The systems consist of Ecophon Super G™ tiles and Ecophon Connect grid. The surface has a strong glass fibre fabric and the back of the tile is covered with glass tissue. The system is available with the edges A and B.



Ecophon Akusto™ Wall – reduces horizontal sound reflections and improves speech clarity

The Ecophon Akusto™ Wall system consists of wall absorbers with a variety of different edges, surfaces, colours, patterns and profiles like:

- Edges A and C
- Texona surface in 16 colours
- Muralis surface with a variety of printed patterns
- Akutex FT surface in 9 colours
- Super G impact resistant surface in three colours
- Connect Thinline, WP or Channel trim profiles



Muralis, by Susanna Sivonen



Muralis, by Maria Westerberg

For more detailed information about our products and to see our full range of printed patterns on Muralis surface, please visit www.ecophon.com.

Product performance

that matches sound requirements

When choosing an acoustic system, it is vital to make sure that the products' performance matches your acoustic requirements and preferences. At Ecophon, we work with four acoustic qualities to describe the acoustic requirements – sound strength, sound propagation, speech clarity and reverberation. Ecophon systems are designed to ensure the best possible performance for each of the qualities



Sound strength

If a low noise level is prioritised

- choose Class A absorbers with as high an absorption factor (α) as possible.



Sound propagation

If short sound propagation is prioritised

- choose absorbers with an AC-value of ≥ 180 .



Speech clarity

If the speech clarity is prioritised

- contact Ecophon to choose the right mix of absorbers and reflectors.



Reverberation

If reverberation is prioritised either long or short

- contact Ecophon to choose the right mix of absorbers and reflectors.

If the main priority is listening comfort then measuring frequency band 125 Hz is a relevant acoustic measure.

Product performance

Absorption Class is a division of sound absorbers into classes A-E where A has the highest sound-absorbing ability and E the lowest, in accordance with EN ISO 1164.

The absorption factor, α , is a measurement of how much of the sound is absorbed that hits the absorbers. If $\alpha = 1$ then all sound caught is absorbed, if $\alpha = 0$ then all sound is reflected.

An AC-value (Articulation Class) is a method of classifying acoustic ceilings by how much the ceiling helps to shorten sound propagation. The higher the AC-value, the shorter the sound propagation.

We can help

you achieve acoustic comfort

Our Concept Developers, dedicated to the education sector can advise you how to go about planning the acoustic environment in the early stages. This requires careful consideration of the specific needs of the users, their teaching and learning approaches and wishes for adaptable use and management of space.

The acoustic environment plays a key role in supporting good teaching and learning and we can assist you with the following needs:

- Identifying what demands should be placed on the acoustic environment, based on the room or space design, the type of activities to be performed and the individual acoustic preferences.
- Developing room acoustic specifications and sound strategies.
- Defining acoustic terminology and explaining the relevant (local) acoustic standards.
- Developing acoustic solutions which meet your specific needs.

Our Concept Developers can provide specialist acoustic training, building case studies, seminars on sound, speech and hearing including the latest research findings regarding acoustics in educational buildings.

If you need specific information about our products and system solutions, please contact our technical support.



Other relevant resources:

Systems and products catalogue

- On our web you can always find all our systems pages as downloadable pdf's just the way they look in the catalogue or request it from your local area sales manager

Ecophon Master™ Rigid system literature

- available on www.ecophon.com

The Essex Study summary

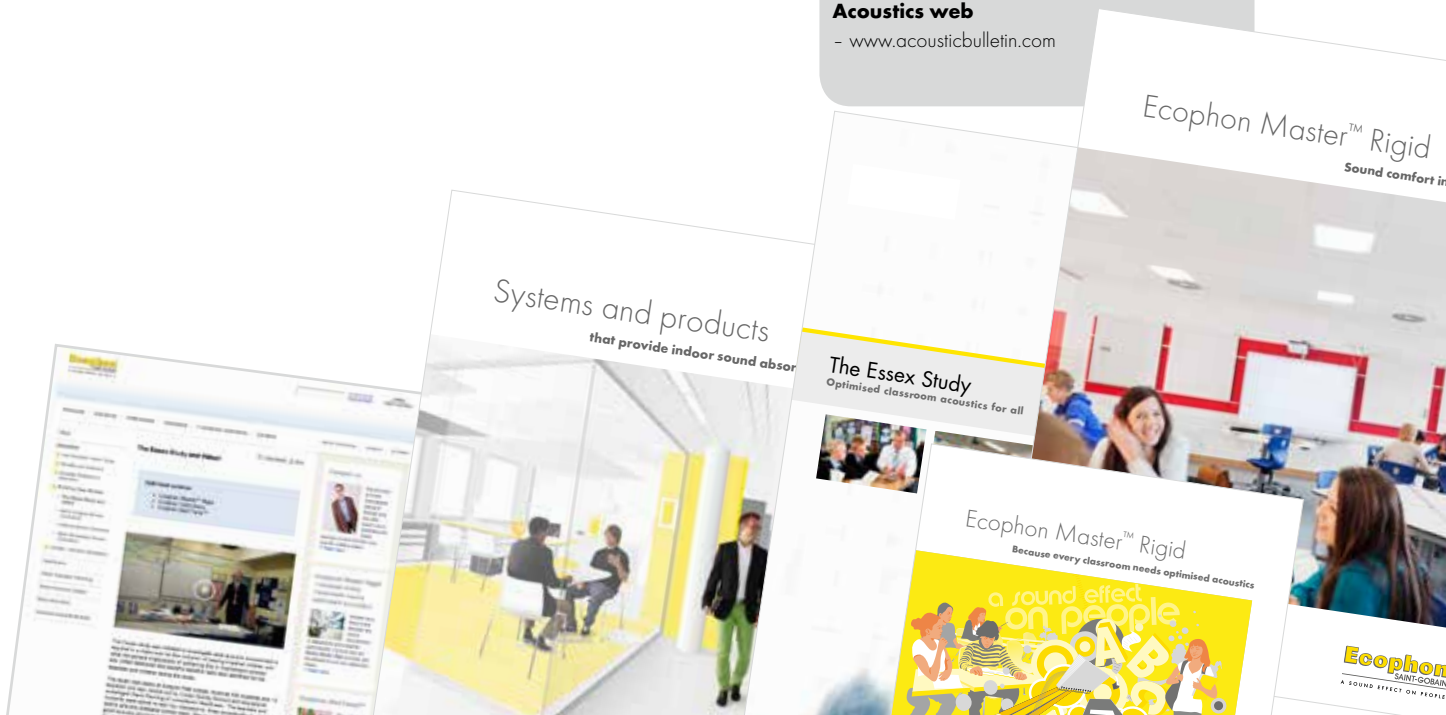
- available on www.ecophon.com.

Sweyne Park classrooms movie

- watch it on www.ecophon.com

Acoustics web

- www.acousticbulletin.com



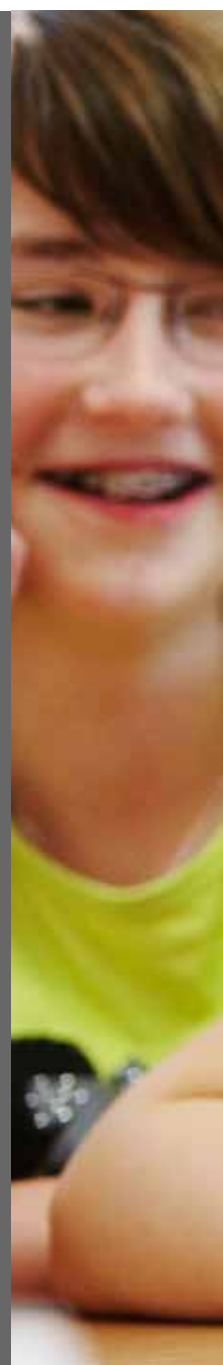


A SOUND EFFECT ON PEOPLE

Ecophon dates back to 1958, when the first sound absorbers from glass wool were produced in Sweden to improve the acoustic working environment. Today the company is a global supplier of acoustic systems that contribute to good room acoustics and a healthy indoor environment, with the focus on offices, education, health care and industrial manufacturing premises. Ecophon is part of the Saint-Gobain Group and has sales units and distributors in many countries.

Ecophon's efforts are guided by a vision of earning global leadership in acoustic ceiling and wall absorber systems by providing superior end user value. Ecophon maintains an on-going dialogue with government agencies, working environment organisations and research institutes, and is involved in formulating national standards in the field of room acoustics where Ecophon contributes to a better working environment wherever people work and communicate.

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